

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements in Metal Sealing Washers

We, DAMIC CONTROLS LIMITED, a British Company, of 268, High Street, Uxbridge, Middlesex, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The chief object of the present invention is to evolve a metal sealing washer which will provide a very efficient seal under high pressure and temperature conditions when sealing washers composed of resilient materials such as natural or synthetic rubber would fail.

A further object of the invention is to evolve a sealing washer which will ensure a good seal without necessitating the washer being subjected to a high-clamping pressure between the parts which are to be sealed.

According to the present invention there is provided a metal sealing washer having a plane upper surface, a single annular sealing face projecting above said plane surface along one edge of the washer, a plane lower surface, a single annular sealing face projecting below the lower plane surface along one edge of the washer, the two sealing faces being adapted to make linear or substantially linear engagement with the parts between which the washer is interposed, the washer being undercut on its inner or outer periphery between the upper and lower sealing faces for the purpose of rendering them resilient and ensuring their resilient engagement with the parts between which the washer is interposed.

Referring to the drawings:

Figures 1 and 2, are sectional views illustrating two alternative forms of sealing washers in accordance with the invention.

The washers illustrated have each been designed to make linear or substantially linear sealing engagement with the two parts between which the washer is interposed, and in a resilient manner.

Each washer is preferably produced by a machining operation from a suitable metal such as, for example, steel, stainless steel, bronze

or aluminium alloy, the metal employed being selected to suit the characteristics of the parts between which the washer is to be interposed and the pressure and temperature range over which an effective seal must be maintained.

Each washer 1 is formed with upwardly and downwardly directed annular sealing faces 2 which are designed to make linear or substantially linear engagement with the parts between which the washer is interposed.

Referring in the first instance to Figure 1, it will be seen that the washer includes two parallel plane upper and lower surfaces 3 adjacent its outer periphery which merge into upwardly and downwardly inclined surfaces 4 leading to the actual sealing face 2 which is intended to make linear or substantially linear edge contact with the parts between which the washer is to be interposed.

The sealing faces 2 define the hole or opening in the washer. To ensure resilient engagement of the sealing faces 2 with the parts between which the washer is interposed, the washer is internally undercut at 5 to a depth approximating to the width of the inclined surfaces 4.

If, therefore, considerable pressure is applied to the washer, the sealing faces 2, in addition to tending to bite into the surfaces of the parts between which the washer is interposed, will tend to flatten out, but complete collapse will be prevented by the parts contacting the parallel surfaces 3.

It is preferred that the undercut 5 shall have an inclined angle "A" of approximately 90° but this angle may be varied within wide limits to suit particular conditions, whilst the angle of inclination "B" of the surfaces 4 preferably will be in the region of 10° although this angle may be varied within wide limits to suit the particular size of washer and material of which the washer is composed.

In Figure 2 the inclined surfaces 4 are directed outwardly, the undercut 5 lying around the washer's outer periphery.

As will be seen clearly in the accompanying

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drawings, the actual sealing face which engages the parts takes the form of an annular face of approximately .010 inches in width.

It will be appreciated that with each washer hereinbefore described, the sealing faces will make substantially linear sealing engagement with the parts between which the washer is interposed, under light pressure, increased pressure tending to cause the sealing faces to bite into the two surfaces of the parts, an abnormally high pressure being unnecessary to ensure a good seal.

If desired, the washer, if composed of a suitable metal, may be hardened in part or in whole to still further improve its sealing properties.

WHAT WE CLAIM IS:—

1. A metal sealing washer having a plane upper surface, a single annular sealing face projecting above said plane surface along one edge of the washer, a plane lower surface, a single annular sealing face projecting below the lower plane surface along one edge of the washer, the two sealing faces being adapted to make linear or substantially linear engagement

with the parts between which the washer is interposed, the washer being undercut on its inner or outer periphery between the upper and lower sealing faces for the purpose of rendering them resilient and ensuring their resilient engagement with the parts between which the washer is interposed.

2. A metal sealing washer as claimed in Claim 1, wherein the undercut takes the form of an annular "V" shaped groove formed in the inner or outer peripheral edges of the washer.

3. A metal sealing washer as claimed in Claim 1 or 2, wherein the two sealing faces are connected with the plane upper and lower surfaces by oppositely inclined surfaces.

4. A metal sealing washer substantially as hereinbefore described with reference to either of the examples illustrated by the accompanying drawings.

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PROVISIONAL SPECIFICATION

Improvements in Metal Sealing Washers

We, DAMIC CONTROLS LIMITED, a British Company, of 268, High Street, Uxbridge, Middlesex, do hereby declare this invention to be described in the following statement:—

The chief object of the present invention is to evolve a metal sealing washer which will provide a very efficient seal under high pressure and temperature conditions when sealing washers composed of resilient materials such as natural or synthetic rubber would fail.

A further object of the invention is to evolve a sealing washer which will ensure a good seal without necessitating the washer being subjected to a high clamping pressure between the parts which are to be sealed.

A metal sealing washer in accordance with the present invention is constructed from steel, bronze, aluminium alloy, or other comparatively hard and springy material, and includes on its opposite faces two annular sealing faces which lie proud of the central part of the washer and make linear engagement with the parts which are to be sealed.

The washer will be clamped between the parts which are to be sealed and consequently there will be a tendency for the washer to flatten out under the clamping pressure. The washer, however, by virtue of its springy nature will, with a minimum of clamping pressure, make good sealing engagement with the parts and will only be temporarily distorted.

Although the washer may be machined from a single piece of steel or other suitable

material, it is preferred from the point of view of cheapness and ease of manufacture, to construct it as two components arranged back to back and in the form of steel stampings or pressings. The two components may be of identical shape and construction, each component including a flat peripheral rim having a central hole, the edge of which is plunged to form a truncated conical part, the edge of which part makes the desired annular sealing engagement.

It is preferred to provide the components with some means to ensure their relative location in a radial direction and if necessary to prevent their separation. With this object in view, both components are, for example, formed with co-operating projections and holes or recesses.

For example, the flat peripheral rim of one component may be formed with a hole and a pressed-out projection, the hole and projection being arranged diametrically on opposite sides of the axis. The projection on the one component will enter the hole or recess in the other component, the two components being identically shaped. Alternatively, the two components may be formed integrally and connected by a narrow neck portion which can be folded over so that the two identical integral components lie in accurate registration, the two annular sealing faces projecting from opposite sides of the completed sealing washer.

It is preferred that the components shall be

suitably hardened, so that they will more effectively bite into the surfaces of the parts which they are intended to seal.

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FIG. 1.

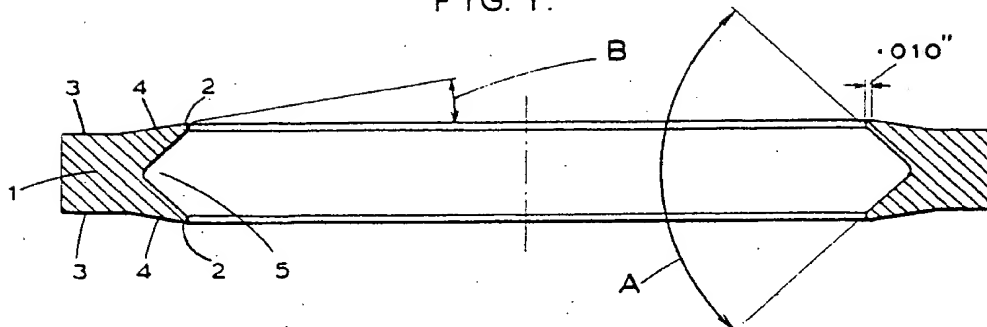


FIG. 2.

